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The Relation Between Group Cohesiveness and Performance: An Integration

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This paper reports on a meta-analytic integration of the relation between group cohesiveness and performance. Overall, the cohesiveness-performance effect was highly significant and of small magnitude. Several theoretically informative determinants of the cohesiveness-performance effect were examined. This effect was significantly stronger when cohesiveness was operationalized in terms of measurements of group members' perceptions of cohesiveness than when cohesiveness was operationalized in terms of experimental inductions of cohesiveness. The results of this analysis suggest that the more direct effect may be from performance to cohesiveness rather than from cohesiveness to performance. Discussion considers the implications of these results for future research on the relation between cohesiveness and performance.

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The Relation Between Group Cohesiveness and Performance: An Integration

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The Relation Between Group Cohesiveness and Performance: An Integration

Abstract

This paper reports the results of a meta-analytic integration of the relation between group cohesiveness and performance. Overall, the cohesiveness - performance effect was highly significant and of small magnitude. Several theoretically informative determinants of the cohesiveness - performance effect were examined. This effect was significantly stronger when cohesiveness was operationalized in terms of measurements of group members' perceptions of cohesiveness than when cohesiveness was operationalized in terms of experimental inductions of cohesiveness. The cohesiveness - performance effect was not stronger among groups that required higher degrees of interaction for successful performance. The cohesiveness - performance effect was stronger in smaller groups, and among real groups compared to artificial groups created in the laboratory. The separate contributions of different components of group cohesiveness were gauged, revealing that the relation between cohesiveness and performance is due primarily to the "commitment to the task" component of cohesiveness, and not the "interpersonal attraction" or "group pride" components of cohesiveness. Finally, an analysis of a subset of studies that reported multiple measurements of cohesiveness and performance over time yielded a meta-analytic cross-lagged panel correlation analysis. The results of this analysis suggested that the more direct effect may be from performance to cohesiveness rather than

from cohesiveness to performance. Discussion considers the implications of these results for future research on the relation between cohesiveness and performance.

The Relation Between Group Cohesiveness and Performance: An Integration

> All that year, the animals worked like slaves. But they were happy in their work; they grudged no effort or sacrifice, well aware that everything that they did was for the benefit of themselves and those of their kind who would come after them.
>
> George Orwell (1946, p. 63).

Group cohesiveness has consistently remained one of the most interesting and most elusive constructs in the study of small group behavior, stimulating active research interests in social psychology, group dynamics, organizational behavior, and sport psychology. Festinger (1950) described group cohesiveness as "the resultant forces which are acting on the members to stay in a group," and most subsequent research on group cohesiveness has tended to accept this description. Perhaps the most visible and active use of group cohesiveness over the years has been as a possible predictor of group performance. This paper reports the results of an integration of previous research examining the cohesiveness - performance relation.

Several considerations need to be addressed in examining the relation between cohesiveness and performance: The significance and magnitude, the very existence, of the cohesiveness - performance effect needs to be established. Differences between correlational tests of the cohesiveness - performance effect and experimental tests of the cohesiveness - performance effect might be expected, but have never been examined. The effects of various aspects of the nature of the group (such as the degree of interaction required by

the group, the reality of the group categorization, and the size of the group) on the cohesiveness - performance effect need to be specified, particularly in light of recent findings in cognate areas that the nature of the group exerts a considerable effect on other group phenomena. The contribution of different components of group cohesiveness to the relation between cohesiveness and performance requires clarification. Finally, temporal patterns in the relations between cohesiveness and performance, from cohesiveness to performance and from performance to cohesiveness, have yet to be conclusively delineated. Each of these considerations will be addressed in turn below.

The Existence of the Cohesiveness - Performance Effect.

There have been several narrative reviews of the group cohesiveness - performance research (e.g., Lott & Lott, 1965; Mudrack, 1989; Steiner, 1972; Summers, Coffelt, & Horton, 1988). These narrative reviews have rendered various and conflicting conclusions. For example, Steiner (1972, p. 33) confidently asserted that: "These findings do not support the view that group productivity and cohesiveness tend to be positively related." Alternatively, Summers et al. (1988, p. 631) asserted with equal confidence that: "In general, cohesion promotes productivity." Layered on top of this latent contradiction in the scholarly journals, textbooks in a variety of specialized fields within psychology depict a mixed and inconclusive stance towards the cohesiveness - performance effect. The most negative portrayals of the cohesiveness - performance effect can be found in textbooks on organizational behavior. For example, Mitchell (1982) has posited

that: "However, the major output of interest -- performance -- has not been positively related to the level of attraction [i.e., cohesiveness]" (p. 217). Portrayals that are almost as unencouraging can be found in textbooks on group dynamics. For example, Forsythe (1990) has observed that: "The implications of these findings are clear: cohesive groups are often more enjoyable, but they aren't always more productive" (p. 87). Somewhat more encouraging descriptions of the cohesiveness - performance effect are sometimes found in social psychology textbooks. For example, Worchel, Cooper, and Goethals (1991) noted that: "In the final analysis, we can conclude that cohesiveness usually increases a group's productivity. However, there are exceptions to this rule that must also be considered" (p. 448). Perhaps the most sanguinary considerations of the cohesiveness - performance effect can be found in textbooks devoted to sport psychology. For example, Widmeyer, Brawley, and Carron (1992) summarized: "One of us (Carron, 1988) has pointed out that the existing research examining the effects of team cohesion on performance ... are mixed. However, Carron has also noted that there tend to be more studies supporting a positive relationship between these variables" (p. 173). In light of the contradictions presented in the scholarly journals and the inconclusive stance presented in textbooks from such diverse subfields in psychology, it seems particularly important to determine in precise terms the significance and the magnitude of the relation (or the lack thereof) between cohesiveness and performance.

Given the interest in, and the apparent confusion regarding, the cohesiveness - performance effect, it is not surprising that

there have been preliminary efforts to meta-analytically integrate this research domain. For example, Oliver (1990) reported a mean cohesiveness - performance effect size of $\bar{r}$ = .32, and Evans and Dion (1991) reported a mean cohesiveness - performance effect size of $\bar{r}$ = .364. These estimates of a moderate magnitude cohesiveness - performance effect are encouraging, particularly in light of the contradictions that characterize previous narrative summaries of this phenomenon (cited in the preceeding paragraph). However, these encouraging estimates of a moderate effect need to be interpreted with some caution, for several reasons. Oliver's (1990) analyses were restricted to studies that examined real groups. This restriction to real groups may be defensible. However the mixed and inconclusive narrative summaries of the cohesiveness - performance effect may result, in part, from weaker results obtained in the laboratory research which was not included in Oliver's (1990) effort. Evans and Dion's (1991) efforts were troubled by inconsistent criteria for handling multiple effect sizes from a given study. In some instances (e.g., Deep, Bass, & Vaughan, 1967; Hemphill & Sechrest, 1952), Evans and Dion apparently selected the cohesiveness measure producing the strongest correlation with performance, rather than collapsing across multiple indicators to derive a single composite effect size for each study (as described in the procedure section of this integration). Similarly, when multiple estimates of the cohesiveness - performance effect were reported in a given study across multiple points in time, Evans and Dion sometimes selected the final effect size for that study (e.g., Bakeman & Helmreich, 1975) and sometimes did not (e.g., Williams &

Hacker, 1982). Perhaps most importantly, both of these earlier meta-analyses were based on relatively small samples from the available literature examining the cohesiveness - performance effect. Specifically, Oliver's (1990) effort was restricted to 14 studies, and Evans and Dion's (1991) effort was restricted to 16 studies (as detailed below, a total of 49 studies render includable tests of the cohesiveness - performance effect).

Not only do the estimates of a moderate magnitude cohesiveness - performance effect in these previous efforts need to be interpreted with caution. In addition, neither of these previous efforts went beyond the initial meta-analytic question of "central tendency" (Mullen, 1989). That is, neither Oliver (1990) nor Evans and Dion (1991) examined any of the fundamental questions about the cohesiveness - performance effect other than "what is the typical study outcome?" While the disagreement between narrative summaries of the cohesiveness - performance effect demands a careful and precise scrutiny of the significance and magnitude of the cohesiveness - performance effect, important theoretical questions have guided, and been stimulated by, this research over the years. These questions are a central concern in the present effort, and can be highlighted as follows.

Effects of Operationalization of Cohesiveness:
Correlational Paradigm vs. Experimental Paradigm.

In attempting to determine the effects of cohesiveness on performance, two different paradigms have developed around alternative operationalizations of cohesiveness. One paradigm (e.g., Darley, Gross & Martin, 1952) has examined the cohesiveness -

performance effect by measuring the level of cohesiveness as perceived by members of the group, and then examining whether this measurement of cohesiveness correlates with group performance. This paradigm will be referred to below as the correlational paradigm. The other paradigm (e.g., Schachter et al., 1951) has examined the cohesiveness - performance effect by experimentally inducing high or low levels of cohesiveness in ad hoc groups, and then examining whether the performance of the high cohesiveness induction groups was greater than the performance of the low cohesiveness induction groups. This paradigm will be referred to below as the experimental paradigm.

Each of these two paradigms has unique strengths and weaknesses. The correlational paradigm has the advantage of employing a continuous metric of cohesiveness. As discussed at length in Mullen (1989, chapter 4), the magnitude of effect gauging the relation between two variables can be reduced dramatically if one of those variables is truncated from a continuous metric to a categorical metric (due, in large part, to the information loss perpetrated by this truncation). Thus, the experimental paradigm might render a weaker cohesiveness - performance effect because of the degradation of the inherently continuous metric of "cohesiveness" into the dichotomy of "high vs. low cohesiveness." Alternatively, while the cohesiveness - performance effect implies the effect of cohesiveness on performance, some of the observed co-variation in the correlational paradigm may be due to an effect of performance on cohesiveness. This issue of causal ordering will be returned to below. In the present context, this issue suggests that

the correlational paradigm may be troubled by the question of direction of influence, whereas the experimental paradigm provides an experimental solution to this question by controlling cohesiveness and gauging changes in subsequent performance.

The most plausible pattern of results is for the experimental paradigm to yield a weaker cohesiveness - performance effect than that rendered by the correlational paradigm. This pattern might be attributable to the degradation of the continuous metric of cohesiveness into a categorical metric of high vs. low cohesiveness, or this pattern might be attributable to the removal of the impact of performance on cohesiveness from the cohesiveness - performance effect obtained in the experimental paradigm. These plausible differences between research paradigms have not been addressed in previous considerations of this research literature, and the existence of (and explanation for) such paradigm effects is another central concern of the present integration.

Contributions of the Nature of the Group.

The magnitude of the cohesiveness - performance effect might be expected to vary as a function of the nature of the group. Three elements of the nature of the group that could influence the cohesiveness - performance relation are the degree of interaction required by the group, the reality of the group, and group size. The degree of interaction required by the group for successful performance has been proposed by some researchers to be an important determinant of the cohesiveness - performance effect. For example, Cratty (1989) has argued that a positive cohesiveness - performance effect would emerge among teams where successful performance depends

on close interacting group effort (e.g., hockey). Similarly, Widmeyer et al. (1992) have observed that failures to detect a positive cohesiveness - performance effect have typically been found in teams where successful performance is more individually oriented (e.g., marksmanship).

The implicit assumption behind these observations seems to be that cohesiveness can enhance performance for those groups in which suboptimal performance results from inadequate coordination between group members. This is reminiscent of Anderson's (1978) tongue-in-cheek response to Buys' (1978) well-known "Humans would do better without groups." In her response, entitled "Groups would do better without humans," Anderson argued that,

> The future looks brighter as computer technology will soon be sufficient to replace the fumbling human in groups. But until that time we are stuck with human error variance as the "grit" in a finely tuned group system. (p. 557).

In the present context, this implicit assumption models cohesiveness as a figurative "lubricant" which minimizes the friction due to the human "grit" in the system. More precisely, this hypothesis suggests that a stronger cohesiveness - performance effect in groups that require a greater degree of interaction would indicate that cohesiveness exerts its effects on performance by improving coordination among group members and thereby enhancing the smooth operation of the group as a system.

Reality of group categorization affects the magnitude of several other phenomena, including the participation - leadership effect (Mullen, Salas, & Driskell, 1989), the relative heterogeneity

effect (Mullen & Hu, 1989), and the ingroup bias effect (Mullen, Brown, & Smith, 1992). The point is not that ad hoc, laboratory groups are in some way unreal groups. However, there are palpable differences between ad hoc groups of strangers created for a twenty minute session in the social psychological laboratory and real groups that interact on multiple occassions and provide group members with longer and deeper experience with the group. Real groups (by definition) carry with them a history of information and experience that bolsters the impact of real group categorizations. The more extensive co-occurence of group members over time and space probably lends a higher degree of "group-ness," or what Campbell (1958) termed entitativity, to real groups compared to ad hoc groups created in the lab. Real group categorizations appear to be more salient to group members than artificial group categorizations, and this increased salience seems to prime or exaggerate underlying mechanisms of group phenomena (see Mullen, 1991, for a discussion). In the context of the cohesiveness - performance research, all of the groups employed in the experimental paradigm are ad hoc, artificial groups created in the lab and subjected to experimental inductions of cohesiveness (this reliance upon artificial groups may provide a third reason why the experimental paradigm might produce a weaker cohesiveness - performance effect). Within the correlational paradigm, the effects of the reality of the group observed in other group phenomena suggests that the cohesiveness - performance effect would be stronger among real groups and weaker among artificial groups created in the laboratory.

Similarly, group size has been documented to affect the

magnitude of several other phenomena, including the participation leadership effect (Mullen et al., 1989), the relative heterogeneity effect (Mullen & Hu, 1989), the ingroup bias effect (Mullen et al., 1992), and social projection effects (Mullen & Hu, 1988). Larger groups tend to encourage deindividuation among group members (e.g., Mullen, 1987; Mullen & Baumeister, 1987). Moreover, it is well established that as group size increases group members' liking for the group decreases (e.g., Indik, 1965; Katz, 1949; Slater, 1958), and group members' performance decreases (Mullen & Baumeister, 1987; Mullen, Johnson, & Drake, 1987). It is likely that, in larger groups, both cohesiveness and performance are reduced to low levels, and the resultant lack of variability in cohesiveness and performance in large groups results in smaller cohesiveness - performance effects. Thus, we would expect the cohesiveness - performance effect to be stronger among smaller groups and weaker among larger groups.

In spite of the consistent tendency for the nature of the group to impact upon several similar group phenomena, there has been no consideration of these effects of the nature of the group on the cohesiveness - performance effect. Therefore, another important goal of the present effort is to determine the impact of the nature of the group on the relation between cohesiveness and performance.

Contributions of the Components of Cohesiveness.

At the outset, we highlighted how most subsequent research has tended to accept Festinger's (1950) description of group cohesiveness as "the resultant forces which are acting on the members to stay in a group." However, as carefully detailed by

Mudrack (1989), the ease with which cohesiveness can be described has been accompanied by an astonishing difficulty in defining cohesiveness in an agreed upon manner. For example, consider Stogdill's (1972) narrative review of the cohesiveness - performance effect (cited above). This review concluded that no clear relation existed between these two constructs, based upon an overview of 25 studies which Stogdill characterized as being equally likely to show a positive relation, no relation or a negative relation between cohesiveness and performance. However, as Mudrack (1989) noted:

> What Stogdill (1972) neglected to do, however, was to classify these 25 studies in terms of how cohesiveness was actually operationalized in each one. Such a classification ... reveals that no two studies referenced by Stogdill operationalized group cohesiveness in exactly the same way. [emphasis in original] In fact, 15 of the 23 studies which this author was able to locate did not specifically attempt to measure cohesiveness at all, and 10 of these 15 did not appear to be concerned with anything remotely resembling cohesiveness.... The remarkable inconsistency in the measurement of cohesiveness raises justifiable concerns as to whether research findings can be meaningfully compared across studies. (p. 775)

Similar concerns have been echoed by Carron (1982), Dailey (1977), and Tziner (1982). Clearly, any effort to provide an integration of research on the cohesiveness - performance effect must carefully scrutinize the construct of group cohesiveness.

In Festinger, Schachter, and Back's (1950) seminal statement, cohesiveness was posited to result from interpersonal attraction, liking for or commitment to the group task, and group status or pride. Despite this multidimensionality in the initial conceptualization of group cohesiveness, a few early reports shifted the conceptualization of cohesiveness to a unitary construct. For example, Schachter (1951, p. 192) wrote that "whether cohesiveness is based on friendship, the valence of the activity mediated by the group, or group prestige, the consequences of increasing group cohesiveness are identical." Most subsequent research has more or less assumed this unidimensional conceptualization of group cohesiveness. However, a few earlier studies showed that the separate components of cohesiveness were not in fact correlated very highly with one another (e.g., Back, 1951; Eisman, 1959). A few more recent studies have begun to examine the distinct effects of "interpersonal attraction" and "commitment to task" components of cohesiveness. However, to date there has been no conclusive summary of the relative contributions of the specific components of cohesiveness. Some studies have reported that the impact of cohesiveness on performance is primarily due to interpersonal attraction (e.g., Widmeyer, 1977). Some studies have reported that the impact of cohesiveness on performance is primarily due to commitment to task (e.g., Zaccaro & Lowe, 1986). Finally, some studies have reported that <u>both</u> interpersonal attraction and commitment to task may need to be engaged in order for cohesiveness to affect performance (e.g., Zaccaro & McCoy, 1988). And, while a few researchers have recently concentrated on the relative

contributions of interpersonal attraction and commitment to task, the third component of Festinger et al.'s (1950) original formulation, group pride, is seldom considered.

It is important to note that the relative contributions of these three components of cohesiveness to the cohesiveness - performance effect can provide a window into the mechanisms by which cohesiveness might impact upon performance. Consider the implications of a significant cohesiveness - performance effect which is primarily due to one of Festinger's three components of cohesiveness. If the cohesiveness - performance effect was primarily due to interpersonal attraction, then group members would be exerting efforts toward performance for the sake of their well-liked group members. If the cohesiveness - performance effect was primarily due to commitment to the task, then group members would be exerting efforts toward performance for the intrinsic pleasure of completing a task that group members tend to enjoy. And, if the cohesiveness - performance effect was primarily due to group pride, then group members would be exerting efforts towards performance for the pleasure of belonging to a higher status successful group. Thus, the relative contributions of these three distinct components of cohesiveness to the cohesiveness - performance effect can begin to clarify the fundamental question of <u>why</u> group cohesiveness should affect performance.

The effects of distinct components of cohesiveness can be examined in the present context by considering the operationalizations of cohesiveness that have been used in this research domain. Questionnaires designed to measure cohesiveness

can be decomposed into subscales or items that tap into the specific components of group cohesiveness. And, procedures designed to induce cohesiveness can be gauged on the degree to which they engage the specific components of group cohesiveness. Therefore, a careful examination of the items in the measurements of cohesiveness and the procedures in the manipulations of cohesiveness should help to illuminate the relative contributions of the different components of group cohesiveness.

Temporal Patterns in the Cohesiveness - Performance Effect.

A looming question in the study of the relation between cohesiveness and performance is the direction of effect between these two constructs. Logically, either direction of effect is plausible: On the one hand, group cohesiveness could energize and direct group members towards successful task completion. On the other hand, excellence in performance should make group members feel much better about the group. Clearly, in the experimental paradigm the direction of influence is experimentally controlled to run from the manipulated cohesiveness to the measured performance. Thus, a significant cohesiveness - performance effect in the experimental paradigm provides compelling evidence that cohesiveness can cause performance. However, a significant cohesiveness - performance effect in the experimental paradigm does not mean that every observed co-variation between cohesiveness and performance represents a one-directional effect, pure and simple. In the correlational paradigm, either direction of influence could account for demonstrated cohesiveness - performance effects. Although a few studies have attempted to examine this issue of direction of effect

in the correlational paradigm, there has been to date no clear resolution to this issue. The results of some studies suggest a more direct link from cohesiveness to performance (e.g., Dorfman & Stephan, 1984), and the results of other studies suggest a more direct link from performance to cohesiveness (e.g., Bakeman & Helmreich, 1975). There has been no concerted effort to integrate these results and thereby gauge the relative contributions of cohesiveness to performance and of performance to cohesiveness.

A Meta-analytic Integration

In an effort to examine these issues, a meta-analytic integration (Mullen, 1989; Mullen & Rosenthal, 1985; Rosenthal, 1991) was conducted on research examining the cohesiveness - performance effect. There were three major goals of this meta-analysis. First, one goal of this meta-analysis was to provide a precise summary of the significance and magnitude of the cohesiveness - performance effect. The voluminous body of research on this effect, and several narrative reviews of this research, have failed to conclusively establish the existence of this effect. Recent preliminary meta-analytic integrations of this phenomenon have suggested that there is indeed a cohesiveness - performance effect of moderate magnitude, but these results were based upon small, potentially unrepresentative, samples of the research domain (and, in the case of Evans and Dion's (1991) effort, problematic handling of the database). Therefore, the first goal of this meta-analytic integration of the cohesiveness - performance effect was to provide a precise summary of the overall significance and strength of the cohesiveness - performance effect.

A second goal of this integration was to account for variations in the cohesiveness - performance effect. In several previous narrative reviews, and in two previous meta-analytic integrations, of this research domain there has been little or no consideration of the effects on the cohesiveness - performance effect of (correlational vs. experimental) paradigm, degree of interaction required by the group, the reality of the group, or group size. Moreover, there seems to have developed a paradigmatic assumption about the unidimensionality of the construct of cohesiveness, with only a few preliminary attempts to examine the separate contributions of distinct components of cohesiveness in recent years. Therefore, the second goal of this meta-analytic integration was to determine whether research paradigm, interaction requirements, group reality, group size, and components of cohesiveness moderate the cohesiveness - performance effect.

Finally, there has been no integrative effort to gauge the direction of effects between cohesiveness and performance in the correlational paradigm. Therefore, the third major goal of this integration was to carefully examine the evidence regarding temporal patterns in the cohesiveness - performance effect.

Procedure

Using all of the standard literature search techniques, an exhaustive search was conducted for studies testing the cohesiveness - performance effect. Specifically, on-line computer searches were conducted, using the keywords (Group) -Cohesiveness, -Cohesion, or -Attraction, and Performance or Productivity. These computer searches were supplemented by ancestry approach and descendency

approach searches, correspondence with researchers active in this domain (the "invisible college"), and browsing through the past 30 years of social psychology, sport psychology, applied psychology and management science journals (see Mullen, 1989, for a discussion of literature search techniques). Any studies that were available as of June, 1992 were eligible for inclusion in this integration.

Studies were included if they met the following criteria: Subjects in the studies had to be adolescents or adults not sampled from abnormal populations. Studies had to report (or intelligibly imply) a test of the relation between cohesiveness and performance. Cohesiveness could be operationalized either in terms of the correlational paradigm or the experimental paradigm, as described above. Performance had to be operationalized in terms of some objective indicator (either actual productivity or performance ratings made by someone who was not a group member). Studies which manipulated additional variables (e.g., threat; training; changes in group composition) were eliminated, although if the basic cohesiveness - performance effect was reported for a control condition in such studies, this cohesiveness - performance effect was included. The effect of these criteria for inclusion was to focus upon the relation between cohesiveness and performance in studies that were optimally homogeneous in methodological terms.

For studies from the correlational paradigm, most studies reported only correlations between composite indices of cohesiveness and performance. However, a few studies did report correlations between performance and separate subscales or items from the cohesiveness measure. In a separate set of analyses, full advantage

was taken of these multiple tests of the cohesiveness - performance effect (described below). However, in the main meta-analytic database, only correlations based upon composite indices of cohesiveness were included; if any study reported separate correlations for subscales or items from the cohesiveness measure, these were collapsed across to render a single effect size of the cohesiveness - performance effect for that study.

Finally, for studies from the correlational paradigm, most studies included only synchronous (i.e., one-shot, at-the-same-time) correlations between cohesiveness and performance. However, a few studies did obtain multiple measures of cohesiveness and performance, allowing the derivation of correlations across varying time lags. In a separate set of analyses, full advantage was taken of these multiple measures (described below). However, in the main meta-analytic database, only synchronous correlations were included; if any study reported more than one synchronous correlation, these were collapsed across to render a single effect size of the cohesiveness - performance effect for that study.

In the course of conducting this literature search, over 200 published and unpublished papers, reports, and theses were examined. The selection criteria above rendered a total of 49 papers (Bakeman & Helmreich, 1975; Bhatara, 1972; Blades, 1986; Bowen & Siegel, 1973; Carron & Ball, 1977; Chatterjee, 1972; Courtright, 1978; Dailey, 1978; Darley, Gross, & Martin, 1952; Deep, Bass, & Vaughan, 1967; Dorfman & Stephan, 1984; Downey, Duffy, & Shiflett, 1975; Elias, 1984; Gekoski, 1952; George & Bettenhausen, 1990; Goodacre, 1951; Gottheil & Vielhaber, 1966; Gowda, 1988; Grace, 1954; Greene,

1989; Haythorn, 1953; Hemphill & Sechrest, 1952; Hoogstraten & Voorst, 1978; Jaffe & Nebenzahl, 1990; Keller, 1986; Landers, Wilkinson, Hatfield, & Barber, 1982; Lodahl & Porter, 1961; Lorenz, 1985; McGrath, 1962; Melnick & Chemers, 1974; Mossholder & Bedeian, 1983; Norris & Niebuhr, 1980; Piper, Marrache, Lacroix, Richardson, & Jones, 1983; Putti, 1985; Rousseau, 1990; Sheikh & Koch, 1977; Shirom, 1976; Siegel & Bowen, 1971; Steel, Shane, & Kennedy, 1990; Stinson & Hellebrandt, 1972; Tehan, 1983; Terborg, Castore, & DeNinno, 1976; Tziner & Vardi, 1983; Widmeyer, 1977; Williams & Hacker, 1982; Williams & Widmeyer, 1991; Wolfe & Box, 1988; Zaccaro & Lowe, 1986; Zaccaro & McCoy, 1988).[2] These 49 papers yielded 66 separate tests of the cohesiveness - performance effect, representing the responses of 8702 subjects.

In addition to the requisite statistical information, each hypothesis test was coded for paradigm (where: 1 = correlational paradigm; 0 = experimental paradigm), interaction requirement (where: 1 = high interaction requirement; 0 = low interaction requirement)[3], reality (where: 1 = a real group, whose members have some contact before and after the study; 0 = an artificial group created for the purpose of the study), and group size. These four predictors were directly coded by two judges with perfect agreement. For those studies in the correlational paradigm that actually reported the specific questionnaire used, and for all studies in the experimental paradigm, three additional predictors were derived: interpersonal attraction, commitment to task, and group pride. For studies in the correlational paradigm, these three predictors represented the proportion of the questionnaire items gauging one of

these three components of cohesiveness. These predictors, based upon factor structures reported in those studies that conducted factor analytic examinations of their questionnaires, were coded by two judges with perfectly reliability.[4] For studies in the experimental paradigm, these three predictors were derived by four judges' ratings (on a scale from 0 ("low") to 100 ("high") of the cohesiveness inductions described in the procedure sections of each study. These four judges' ratings were reliable for each predictor: for interpersonal attraction, mean interjudge correlation $\bar{r}$ = .836, Spearman-Brown effective reliability R = .953; for commitment to task, $\bar{r}$ = .604, R = .859; for group pride, $\bar{r}$ = .468, R = .779.

Each of the hypothesis tests and the corresponding predictor information for the main meta-analytic database are presented in Table 1. The subset of hypothesis tests that allow examination of the three components of cohesiveness are presented in Table 2. The subset of hypothesis tests for correlational paradigm studies that reported multiple correlations over time are presented in Table 3.

Insert Table 1 about here

Results

General Effects

The combined results of these 66 tests of the cohesiveness - performance effect, weighting each hypothesis test by its corresponding sample size, revealed a significant, Z = 8.492, p = 1.51E-16, small, $\bar{Z}_{Fisher}$ = 0.254, $\bar{r}$ = .248, effect.[5] Of the 66 hypothesis tests, 61 (or 92%) reported a positive direction of

effect for the cohesiveness - performance effect. A rather substantial failsafe number of Nfs(p=.05) = 3,766.5 indicates that over 3,700 additional studies averaging no cohesivness - performance effect would be needed before these results could be ascribed to sampling error. Thus, there seems to be substantial support for the general relation between cohesivness and performance. However, contrary to the reports of a moderate magnitude of effect in previous meta-analyses, the cohesiveness - performance effect appears to be of small magnitude.

Paradigm Effects

A significant, Z = 7.371, p = 2.53E-13, small, $\overline{Z}_{Fisher}$ = 0.258, $\overline{r}$ = .252, effect was obtained from the 43 hypothesis tests derived from the correlational paradigm. A significant, Z = 7.131, p = 1.19E-12, smaller, $\overline{Z}_{Fisher}$ = 0.227, $\overline{r}$ = .223, effect was obtained from the 23 hypothesis tests derived from the experimental paradigm. The difference between the magnitudes of these two effects was significant, Z = 1.987, p = .0234, indicating that the cohesiveness - performance effect was significantly stronger in the correlational paradigm.

Nature of the Group

Interaction requirement. A significant, Z =7.384, p = 2.32E-13, small, $\overline{Z}_{Fisher}$ = 0.259, $\overline{r}$ = .253, effect was obtained from the 53 hypothesis tests derived from groups with a high interaction requirement. A signifiant, Z = 4.517, p = 3.19E-6, small, $\overline{Z}_{Fisher}$ = 0.225, $\overline{r}$ = .221, effect was obtained from the 13 hypothesis tests derived from groups with a low interaction requirement. The difference between the magnitudes of these two effects was not

significant, Z = 0.071, p = .4717, indicating that groups with high interaction requirements did not exhibit a stronger cohesiveness - performance effect. This argues against the notion that cohesiveness impacts upon performance by enhancing coordination and "lubricating" the group as a social system.

Reality. All of the hypothesis tests within the experimental paradigm were based upon groups that were, by definition, artificial groups; it is only within the correlational paradigm that both artificial groups and real groups are studied. Within the correlational paradigm, a significant, Z = 6.890, p = 5.50E-12, small, $\overline{Z}_{Fisher}$ = 0.275, $\overline{r}$ = .268, effect was obtained from the 31 hypothesis tests derived from real groups. A significant, Z = 2.895, p = .00190, albeit even smaller, $\overline{Z}_{Fisher}$ = 0.157, $\overline{r}$ = .156, effect was obtained from the 12 hypothesis tests derived from artificial groups. The difference between the magnitudes of these two effects was significant, Z = 4.471, p = 3.94E-6, indicating that the cohesiveness - performance effect was significantly stronger in real groups. Figure 1 depicts the mean magnitude of the cohesiveness - performance effect for both real groups and artificial groups in the correlational paradigm, as well as for (artificial) groups in the experimental paradigm.

Insert Figure 1 about here

Group Size. In view of the significant effects of paradigm and reality of groups delineated above, the relation between the cohesiveness - performance effect and group size was examined

separately for the hypothesis tests in the experimental paradigm (which relied exclusively on artificial groups), for hypothesis tests in the correlational paradigm using artificial groups, and for hypothesis tests in the correlational paradigm using real groups. In the experimental paradigm, there was a nonsignificant trend for the cohesiveness - performance effect to decrease as a function of size, $r = -.198$, $Z = 1.094$, $p = .1369$. Within the correlational paradigm, for artificial groups there was a significant negative relation between group size and the magnitude of the cohesiveness - performance effect, $r = -.575$, $Z = 3.240$, $p = .000598$. A significant negative relation also emerged for real groups in the correlational paradigm, $r = -.253$, $Z = 4.534$, $p = 2.95E-6$.

While in the expected direction and consistent with the effect observed for the two types of groups in the correlational paradigm, the nonsignificant effect of group size in the experimental paradigm may be due to a severely restricted range of group sizes employed in the experimental paradigm. In the correlational paradigm, group sizes ranged from 3 to 10.3 for artificial groups, and from 3 to 20 for real groups. However, in the experimental paradigm, nine hypothesis tests used groups of 3, thirteen hypothesis tests used groups of 4, and only one hypothesis test used groups of 5. Therefore, the nonsignificant trend observed in the experimental paradigm may very well have achieved significance if a comparably broad range of group sizes had been used in the experimental paradigm.

Types of Groups. An unexpected qualification of the cohesiveness - performance effect emerged upon closer examination of

the types of real groups represented in the correlational paradigm studies. A strong cohesiveness - performance effect obtained for the 8 real group hypothesis tests that studied sports teams, $Z = 5.596$, $p = 1.25E\text{-}8$, $\overline{Z}_{Fisher} = 0.600$, $\overline{r} = .537$. This cohesiveness - performance effect was significantly stronger, $Z = 6.309$, $p = 2.00E\text{-}10$, than the effect observed for the 10 real group hypothesis tests that studied military groups, $Z = 3.760$, $p = .000085$, $\overline{Z}_{Fisher} = 0.233$, $\overline{r} = .229$. In turn, this cohesiveness - performance was significantly stronger, $Z = 1.646$, $p = .0499$, than the effect observed for the remaining 13 non-sport, non-military real groups, $Z = 4.185$, $p = 1.43E\text{-}5$, $\overline{Z}_{Fisher} = 0.201$, $\overline{r} = .198$. However, the cohesiveness - performance effect for these remaining real groups was still significantly stronger, $Z = 1.656$, $p = .0489$, than the effect observed in the 12 artificial groups, $Z = 2.895$, $p = .00190$, $\overline{Z}_{Fisher} = 0.157$, $\overline{r} = .156$. The mean magnitude of the cohesiveness - performance effect for these different types of groups in the correlational paradigm are presented in Figure 2. Thus, all types of real groups exhibit a significantly stronger cohesiveness - performance effect than artificial groups. This is the case for non-sport, non-military real groups, this is even stronger for military real groups, and this is strongest for sports teams.

Insert Figure 2 about here

The Components of Cohesiveness

The relative contributions of the separate components of cohesiveness were examined by gauging the extent to which the

magnitude of the cohesiveness - performance effect was predicted by the degree to which each hypothesis test's operationalization of cohesiveness involved each specific component of cohesiveness. A total of 31 hypothesis tests from the correlational paradigm, and all of the 23 hypothesis tests from the experimental paradigm, afforded the derivation of the interpersonal attraction, commitment to task, and group pride components of cohesiveness. For the experimental paradigm studies, the cohesiveness - performance effect increased as a function of the degree to which the operationalization of cohesiveness involved interpersonal attraction, $r = .271$, $Z = 1.369$, $p = .0855$, commitment to task, $r = .428$, $Z = 2.286$, $p = .0111$, and group pride, $r = .403$, $Z = 2.040$, $p = .0207$. For the correlational paradigm studies, the cohesiveness - performance effect decreased as a function of interpersonal attraction, $r = -.132$, $Z = 2.497$, $p = .00627$, and group pride, $r = -.084$, $Z = 1.599$, $p = .0549$, and increased as a function of commitment to the task, $r = .249$, $Z = 4.645$, $p = 1.74E-6$. Thus, within each paradigm, commitment to task appears to emerge as the critical component of cohesiveness: Commitment to task is the most robust predictor of the cohesiveness - performance effect in the experimental paradigm, and it is the only predictor of the cohesiveness - performance effect in the correlational paradigm.

It should be noted that there were moderate, and opposite, degrees of intercorrelation among these three components of cohesiveness in the two paradigms. In the experimental paradigm, the mean correlation between the three components of cohesiveness was $r = .489$. In the correlational paradigm, the mean correlation

between the three components of cohesiveness was r = -.344. The positive mean intercorrelation of the three components in the experimental paradigm indicates how a given experimental induction of cohesiveness might engage all three components of cohesiveness to some degree. The fact that this mean intercorrelation is of only moderate magnitude indicates that these three predictors do capture somewhat independent facets of cohesiveness. In other words, an experimental induction of cohesiveness that involved a lot of interpersonal attraction did not necessarily evoke the same high degree of commitment to the task or group pride. The negative mean intercorrelation of the three components in the correlational paradigm indicates that as the number of items (in a cohesiveness questionnaire of finite length) gauging one component of cohesiveness increases, the number of remaining items that could gauge the other components of cohesiveness decreases. The fact that this mean intercorrelation is of only moderate magnitude is a reflection of the fact that not every item of every questionaire was categorized as either interpersonal attraction, commitment to the task, or group pride. In other words, if the number of items in the questionnaire gauging interpersonal attraction decreased, it didn't necessarily dictate that the number of items gauging commitment to the task or group pride must increase in direct proportion.

In light of these moderate intercorrelations between these three components of cohesiveness, an effort was made to gauge the independent contributions of each component of cohesiveness. Three new predictors were derived, for both experimental paradigm studies and correlational paradigm studies. Within each paradigm, the

degree to which each hypothesis test's operationalization of cohesiveness involved a given component was regressed upon the degree to which that operationalization involved the other two components. The residuals from these regressions represent the variability in that one component of cohesiveness after the variability attributable to the other two components has been removed. For example, the "residual" interpersonal attraction predictor for each hypothesis test represented the extent to which a given hypothesis test's operationalization of cohesiveness involved interpersonal attraction, partialling out the extent to which it also involved commitment to the task and group pride. Analyses of these residual component predictors indicated that interpersonal attraction was not at all relevant to the cohesiveness - performance effect, both for the experimental paradigm studies, $r = .029$, $Z = 0.157$, $p = .4377$, and for the correlational paradigm studies, $r = .043$, $Z = 0.814$, $p = .2078$. Similarly, group pride was not at all relevant to the cohesiveness - performance effect, both for the experimental paradigm studies, $r = .183$, $Z = 0.968$, $p = .1666$, and for the correlational paradigm studies, $r = -.039$, $Z = 0.746$, $p = .2278$. However, commitment to task emerged as an independent predictor of the cohesiveness - performance effect, marginally so for the experimental paradigm studies, $r = .234$, $Z = 1.406$, $p = .0798$, and significantly so for the correlational paradigm studies, $r = .199$, $Z = 3.691$, $p = .000112$. These results indicate that commitment to the task is the primary component of cohesiveness in the cohesiveness - performance effect.

Insert Table 2 about here

Temporal Patterns in the Cohesiveness - Performance Effect

A subset of 7 correlational paradigm studies obtained measures of cohesiveness and performance at multiple points in time (Bakeman & Helmreich, 1975; Bowen & Siegel, 1973; Carron & Ball, 1977; Dorfman & Stephan, 1984; Greene, 1989; Landers et al., 1982; Williams & Hacker, 1982). From these 7 studies, a total of 10 cross-lagged panel correlations (CLPCs) could be derived. CLPC is a technique whereby two variables are measured at two points in time, and the resultant correlations between measurements within and across the time lag are used to explore the possible directions of influence between the two variables. The six correlations derived from each CLPC dataset (two autocorrelations {one for cohesiveness and one for performance}, two synchronous correlations {the correlation between cohesiveness and performance at time 1, and the correlation between cohesiveness and performance at time 2}, and two cross-lagged correlations {the correlation between cohesiveness at time 1 and performance at time 2, and the correlation between cohesiveness at time 2 and performance at time 1}), along with the time-lag between time 1 and time 2, are presented in Table 3.

Insert Table 3 about here

The weighted mean correlations yield the meta-analytic CLPC presented in Figure 3. A considerable amount of discussion has been devoted to the strengths and weaknesses of the CLPC technique (e.g.,

Biddle, Slavings, & Anderson, 1985; Kenny, 1975; Kenny & Harackiewicz, 1979; Locascio, 1982; Mayer, 1986; Mayer & Carroll, 1988; Rogosa, 1980). Rather than using this meta-analytic CLPC to test the significance of causal influences, this meta-analytic CLPC is presented to illustrate temporal patterns in the cohesiveness - performance effect. While cohesiveness at time 1 is a significant, positive predictor of performance at time 2, $\overline{r}$ = .246, performance at time 1 is an even stronger predictor of cohesiveness at time 2, $\overline{r}$ = .505. This meta-analytic CLPC can be used to derive the causal parameters presented in Figure 3, following the procedures detailed in Locascio (1982). The cross-lagged causal parameter from cohesiveness to performance, β_2 = .076, is substantially smaller than the causal parameter from performance to cohesiveness, γ_2 = .360. We should be cautious in interpreting these meta-analytic cross-lagged panel data: These results suggest that, while cohesiveness may indeed lead the group to perform better, the tendency for the group to experience greater cohesiveness after successful performance may be even stronger.

Insert Figure 3 about here

Another way to examine the relative influences of cohesiveness and performance is to consider the effects of the time lag. No theoretical formulations to date have specified the ideal or operational time-lag for the effects of cohesiveness and/or performance. However, it stands to reason that the longer the lag between the measurements of cohesiveness and performance, the weaker

the impact of one variable upon the other. In order to examine this possibility, the length of the time-lag (which varied from 9 to 270 days in this database) was used to predict the magnitude of the cross-lagged correlations. There is no prediction of the magnitude of the time 1 cohesiveness - time 2 performance effect by time lag, $r = -.005$, $Z = 0.161$, $p = .4362$. However, there is a significant decrease in the magnitude of the time 1 performance - time 2 cohesiveness effect with greater time-lags, $r = -.275$, $Z = 6.495$, $p = 6.46E-11$. While not conclusive, these results are consistent with the idea that the effect exerted by performance on cohesiveness is greater than the effect exerted by cohesiveness on performance.

Discussion

Consistent with the conclusions of some previous scholarly reviews (e.g., Summers et al., 1988), but inconsistent with the conclusions of other previous scholarly reviews (e.g., Stogdill, 1972), these analyses document that the cohesiveness - performance effect does, in fact, exist to a highly significant degree. On the one hand, contrary to the moderate magnitude of effect estimated by previous, more limited, meta-analytic efforts, the present analyses document that the cohesiveness - performance effect is of small magnitude. On the other hand, future summaries of this phenomenon might be best advised to stop referring to the cohesiveness - performance effect as "controversial," "ambiguous," or "unsubstantiated," and begin refering to it as a small but significant effect.

The significant tendency for the cohesiveness - performance effect to be stronger in the correlational paradigm ($\bar{r} = .252$) than

in the experimental paradigm ($\bar{r}$ = .223) deserves careful consideration. Three plausible accounts for this expected difference were described in the introduction: Manipulation of cohesiveness may render weaker effects because of the degradation of the continuous metric of cohesiveness into the dichotomy of high cohesiveness vs. low cohesiveness. Or, manipulations of cohesiveness may render weaker effects because of the experimental removal of the impact of performance on cohesiveness from the observed covariation between cohesiveness and performance. Or, manipulations of cohesiveness involve artificial ad hoc groups which (both in other phenomena and in the present results for the cohesiveness - performance effect) tend to yield weaker group phenomena effects.

The results of the present analyses allow us to evaluate the relative plausibility of these accounts. The removal of the impact of performance on cohesiveness does not seem to account for the weaker effects in the experimental paradigm: The overall mean magnitude of the cohesiveness - performance effect in the correlational paradigm ($\bar{r}$ = .252) was not substantially larger than the mean magnitude of the time 1 cohesiveness - time 2 performance effect in the meta-analytic CLPC ($\bar{r}$ = .246). Hence, removing the impact of performance on cohesiveness from the cohesiveness - performance effect doesn't seem to be reducing the cohesiveness - performance effect. The use of artificial groups in the experimental paradigm might contribute to some extent to the weaker cohesiveness - performance effects in the experimental paradigm. Recall that a very weak magnitude of effect ($\bar{r}$ = .156) was observed

for artificial groups in the correlational paradigm. This weak effect for artificial groups was obtained where use of a continuous metric of cohesiveness, and the potential "contamination" of the cohesiveness - performance effect by the impact of performance on cohesiveness, would both be able to exaggerate the obtained correlation between cohesiveness and performance. Clearly, the use of artificial groups has the potential to weaken the emergence of the cohesiveness - performance effect. In addition, the degradation of the continuous metric into a dichotomy in the experimental paradigm is consistent with the weaker effects observed in that paradigm. These results suggest that future research might be directed toward examining the relative contributions to the cohesiveness - performance effect of the continuous vs. dichotmous operationalizations of cohesiveness and the artificial vs. real group contexts.

The nature of the group, in particular the reality of the group and the size of the group, exerted effects that were generally as expected. Stronger cohesiveness - performance effects were observed for real groups, and for smaller groups. This is consistent with the effects of group size and group reality in other phenomena (Mullen, 1991). This is encouraging insofar as the cohesiveness - performance effect does not seem to be some rare and delicate "hot house" variety phenomenon, restricted to the controlled confines of the research laboratory. On the contrary, the cohesiveness - performance effect is seen to be even more robust out in the real world among real groups.

Contrary to proposals suggested by some narrative reviewers,

groups that require a high degree of interaction for successful performance do not exhibit a stronger cohesiveness - performance effect. This suggests that cohesiveness does not exert its effects on performance by enhancing the smooth operation of the group as a system. The point is not that enhancing the smooth operation of the group will exert no beneficial impact on performance. Rather, to the extent that cohesiveness exerts any impact on performance, it does not seem likely that it does so by serving as a "lubricant" which minimizies friction due to the human "grit" in the system.

Sports teams represent a qualification to the basic cohesiveness - performance effect. While real groups exhibit significantly stronger effects than artificial groups, sports teams exhibit even stronger effects than non-sport real groups. It is interesting in this context to recall the more sanguinary depiction of the cohesiveness - performance effect in sport psychology textbooks (referred to above in the introduction). This more encouraging portrayal of the cohesiveness - performance effect within this specialized field in psychology may be attributable to sport psychology's de facto emphasis upon precisely that type of group exhibiting the strongest cohesiveness - performance effect.

The ordinal ranking of the magnitude of the cohesiveness - performance effect across group types may suggest possible moderators for this effect. Consider the increasing effect of cohesiveness on performance from artificial groups, to non-sport, non-military real groups, to military groups, to sports teams. This trend of increasing cohesiveness - performance effects may map on to increasing degrees of the salience and legitimacy of standards of

excellence: Standards of excellence may be least salient and legitmate in artificial groups and most salient and legitmate in sports teams (e.g., Mullen & Baumeister, 1987). In addition, as suggested in the introduction regarding the more basic distinction between artificial groups and real groups, perhaps this trend of increasing cohesiveness - performance effects reflects increasing degrees of "group-ness" or entitativity across these types of groups (e.g., Campbell, 1958). The point is, these differences between types of groups may be most informative to the extent that we can identify the mechanisms whereby these types of groups exert different effects on group members. Future research can now be directed toward delineating these mechanisms.

Regarding specific components of cohesiveness, the results of these analyses demonstrate that commitment to the task may be the most important component of cohesiveness in the cohesiveness - performance effect. This finding contradicts earlier assertions (e.g., Schachter, 1951) that the consequences of increasing "cohesiveness" were identical regardless of which specific component of cohesiveness was increased. And, this finding resonates to similar calls (e.g., Carron, 1982; Tziner, 1982) for researchers to pay closer attention to the multidimensional nature of cohesiveness. Finally, this finding provides a counterpoint to recent studies which have argued that both interpersonal attraction and commitment to the task are critical to the cohesiveness - performance effect (e.g., Zaccaro & McCoy, 1988). The weight of the available evidence leans towards commitment to the task as the critical component of cohesiveness.

Theoretically, these results address the fundamental question of why group cohesiveness should affect performance. To the extent that cohesiveness exerts an effect on performance, it does not seem likely that members of cohesive groups are exerting more effort towards successful task performance for the sake of their well-liked group members (interpersonal attraction). And, it does not seem likely that members of cohesive groups are exerting more effort towards successful task performance for the pleasure of belonging to a higher status successful group (group pride). Rather, it seems most likely that members of cohesive groups exert more effort towards successful task performance for the intrinsic pleasure of completing a task that the group members tend to enjoy. Practically, these results indicate that efforts to enhance group performance by fostering interpersonal attraction and/or by pumping up group pride are not likely to be effective. Researchers interested in the problems of bolstering group performance might most efficiently direct their efforts towards determining how to increase people's liking for or commitment to group tasks.

Another intriguing result to come out of this integration is the finding that, across several studies, the stronger direction of effect seems to be from performance to cohesiveness, and not from cohesiveness to performance. The stronger cross-lagged causal parameter for time 1 performance - time 2 cohesiveness, the stronger cross-lagged correlation for time 1 performance - time 2 cohesiveness, and the tendency for this cross-lagged correlation to decrease with greater time-lags whereas the time 1 cohesiveness - time 2 performance cross-lagged correlation does not, are all

results that are more consistent with the "performance influences cohesiveness" interpretation than with the "cohesiveness influences performance" interpretation. However, this should be placed squarely in the context of the significant time 1 cohesiveness - time 2 performance effect, as well as the significant cohesiveness - performance effect in the experimental paradigm. The point is not that performance causes cohesiveness, full stop. The present results do suggest that the changes in cohesiveness that can be brought about by performance are likely to be even stronger than the changes in performance that can be brought about by cohesiveness.

In summary, this effort documents that the cohesiveness - performance effect does indeed exist, contrary to many recent summaries of this literature. Future research should begin to address specific mechanisms for the effects of different types of groups, as well as the differences between real groups and artificial groups. Future research should also be sensitized to the apparent primacy of commitment to task in operationalizations of cohesiveness, and to the mutual influences of cohesiveness and performance.

References

Anderson, L.R. (1978). Groups would do better without humans. Personality and Social Psychology, 4, 557-558.

Back, K.W. (1951). Influence through social communication. Journal of Abnormal and Social Psychology, 46, 9-23.

Bakeman, R., & Helmreich, R. (1975). Cohesiveness and performance: Covariation and causality in an undersea environment. Journal of Experimental Social Psychology, 11, 478-489.

Berkowitz, L. (1954). Group standards, cohesiveness, and productivity. Human Relations, 7, 509-519.

Bhatara, K. (1972). Effect of cohesiveness on goal setting behavior in the group. Jabalpur, M.P. (India): Banarsidas Bhanot Publishers.

Biddle, B.J., Slavings, R.L., & Anderson, D.S. (1985). Methodological observations on applied behavioral science. Journal of Applied Behavioral Science, 21, 79-93.

Blades, J.W. (1986). Rules for leadership: Improving unit performance. Washington, DC: National Defense University Press.

Bowen, D.D., & Siegel, J.P. (1973). Process and performance: A longitudinal study of the reactions of small task groups to periodic performance feedback. Human Relations, 26, 433-448.

Buys, V.J. (1978). Humans would do better without groups. Personality and Social Psychology Bulletin, 4, 123-125.

Campbell, D.T. (1958). Common fate, similarity, and other indices of the status of aggregates of persons as social entities. Behavioral Science, 3, 14-25.

Carron, A.V. (1982). Cohesiveness in sport groups: Interpretations

and considerations. Journal of Sport Psychology, 4, 123-138.

Carron, A.V. (1988). Group Dynamics in Sports. London, Ontario: Spodym.

Carron, A.V., & Ball, J.R. (1977). An analysis of the cause - effect characteristics of cohesiveness and participation motivation in intercollegiate hockey. Internationa; Review of Sport Sociology, 12, 49-60.

Chatterjee, A. (1972). The organizational variables of group cohesiveness. Indian Journal of Psychometry and Education, 3, 43-52.

Courtright, J.A. (1978). A laboratory investigation of groupthink. Communication Monographs, 45, 229-246.

Cratty, B.J. (1989). Psychology in contemporary sport. (3rd Edition). Englewood Cliffs, NJ: Prentice Hall.

Dailey, R.C. (1977). The effects of cohesiveness and collaboration on work groups: A theoretical model. Group and Organization Studies, 2, 461-469.

Dailey, R.C. (1978). Perceived group variables as moderators of the task characteristics - individual performance relationship. Journal of Management, 4, 69-80.

Darley, J.G., Gross, N., & Martin, W.C. (1952). Studies of group behavior: Factors associated with the productivity of groups. Journal of Applied Psychology, 36, 396-403.

Deep, S.D., Bass, B.M., & Vaughan, J.A. (1967). Some effects on business gaiming of previous quasi-T group affiliations. Journal of Applied Psychology, 51, 426-431.

Dorfman, P.W., & Stephan, W.G. (1984). The effects of group

performance on cognitions, satisfaction, and behavior: A process model. Journal of Management, 10, 173-192.

Downey, R.G., Duffy, P.J. & Shiflett, S. (1975). Criterion performance measures of leadership and unit effectiveness in small combat units. (ARI Research Memorandum 75-9). Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Eisman, B. (1959). Some operational measures of cohesiveness and their interrealtions. Human Relations, 12, 183-189.

Elias, F.G. (1984). Task-focused self-disclosure: Effects on group cohesiveness, commitment to task, and group productivity. Ph.D. dissertation, University of California - Santa Barbara.

Evans, C.R., & Dion, K.L. (1991). Group cohesion and performance: A meta-analysis. Small Group Research, 22, 175-186.

Festinger, L. (1950). Informal social communication. Psychological Review, 57, 271-282.

Festinger, L., Schachter, S., & Back, K. (1950). Social pressures in informal groups: A study of human factors in housing. Stanford, CA: Stanford University Press.

Forsythe, D. (1990). Group Dynamics. Boston, MA: Allyn & Bacon.

Gekoski, N. (1952). Predicting group productivity. Personnel Psychology, 5, 281-292.

George, J.M., & Bettenhausen, K. (1990). Understanding prosocial behavior, sales performance, and turnover. Journal of Applied Psychology, 75, 698-709.

Goodacre, D.M. (1951). The use of a sociometric test as a predictor of combat unit effectiveness. Sociometry, 14, 148-152.

Gottheil, E., & Vielhaber, D.P. (1966). Interaction of leader and squad attributes related to performance of military squads. Journal of Social Psychology, 68, 113-127.

Gowda, R.G. (1988). Influence of individual characteristics and group cohesiveness on programmer productivity. Ph.D. dissertation, Georgia State University.

Grace, H.A. (1954). Conformance and performance. Journal of Social Psychology, 40, 333-335.

Greene, C.N. (1989). Cohesion and productivity in work groups. Small Group Behavior, 20, 70-86.

Haythorn, W. (1953). The influence of individual members on the characteristics of small groups. Journal of Abnormal and Social Psychology, 48, 276-284.

Hemphill, J.K., & Sechrest, L.B. (1952). A comparison of three criteria of aircrew effectiveness in combat over Korea. Journal of Applied Psychology,36, 323-327.

Hoogstraten, J., & Vorst, H.C.M. (1978). Group cohesion, task performance, and the experimenter expectancy effect. Human Relations, 31, 939-956.

Indik, B.P. (1965). Operational size and member participation: Some empirical tests of alternative explanations. Human Relations, 18, 339-350.

Jaffe, E.D., & Nebenzahl, I.D. (1990). Group interaction and business game performance. Simulation and Gaming, 21, 133-146.

Katz, D. (1949). Morale and motivation in industry. In W. Dennis (Ed.), Current trends in industrial psychology (pp. 145-171). Pittsburgh, PA: University of Pittsburgh Press.

Keller, R.T. (1986). Predictors of the performance of project groups in R&D organizations. Academy of Management Journal, 29, 715-726.

Kenny, D.A. (1975). Cross-lagged panel correlation: A test for spuriousness. Psychological Bulletin, 82, 887-903.

Kenny, D.A., & Harackiewicz, J.M. (1979). Cross-lagged panel correlation: Practice and promise. Journal of Applied Psychology, 64, 372-379.

Landers, D.M., Wilkinson, M.O., Hatfield, B.D., & Barber, H. (1982). Causality and the cohesion - performance relationship. Journal of Sport Psychology, 4, 170-183.

Locascio, J.J. (1982). The cross-lagged correlation technique: Reconsideration in terms of exploratory utility, assumption specification and robustness. Educational and Psychological Measurement, 42, 1023-1036.

Lodahl, T.M., & Porter, L.W. (1961). Psychometric score patterns, social characteristics, and productivity of small industrial work groups. Journal of Applied Psychology, 45, 73-79.

Lorenz, C.E. (1985). The influence of expectations and cohesiveness on the performance of small groups: A study of quality circles. Ph.D. dissertation, North Carolina State University.

Lott, A.J., & Lott, B.E. (1965). Group cohesiveness as interpersonal attraction: A review of relationships with antecedent and consequent variables. Psychological Bulletin, 64, 259-309.

Mayer, L.S. (1986). Statistical inferences for cross-lagged panel models without the assumption of normal errors. Social Science

Research, 15, 28-42.

Mayer, L.S., & Carroll, S.S. (1988). Measures of dependence for cross-lagged panel models. Sociological Methods and Research, 17, 93-120.

McGrath, J.E. (1962). Influence of positive interpersonal relations on adjustment and effectiveness of rifle teams. Journal of Abnormal and Social Psychology, 65, 365-375.

Melnick, M.J., & Chemers, M.M. (1974). Effects of group social structure on the success of basketball teams. Research Quarterly, 45, 1-8. Mitchell, T.R. (1982). People in organizations: An introduction to organizational behavior (2nd edition). New York, NY: McGraw-Hill.

Mossholder, K.W., & Bedeian, A.G. (1983). Group interactional processes: Individual and group level effects. Group and Organization Studies, 8, 187-202.

Mudrack, P.E. (1989). Group cohesiveness and productivity: A closer look. Human Relations, 9, 771-785.

Mullen, B. (1987). Self-attention theory. In B. Mullen & G.R. Goethals (Eds.), Theories of Group Behavior. (pp. 125-146). New York, NY: Springer-Verlag.

Mullen, B. (1989). Advanced BASIC Meta-analysis. Hillsdale, NJ: Erlbaum.

Mullen, B. (1991). Group composition, salience, and cognitive representations: The phenomenology of being in a group. Journal of Experimental Social Psychology, 27, 297-323.

Mullen, B., & Baumeister, R.F. (1987). Group effects on self-attention and performance: Social loafing, social facilitation,

and social impairment. In C. Hendrick (Ed.), Review of personality and social psychology (pp. 189-206). Beverly Hills, CA: Sage.

Mullen, B., Brown, R.J., & Smith, C. (1992). Ingroup bias as a function of salience, relevance, and status: An integration. European Journal of Social Psychology, 22, 103-122.

Mullen, B., & Hu, L. (1988). Social projection as a function of cognitive mechanisms: Two meta-analytic integrations. British Journal of Social Psychology, 27, 333-356.

Mullen, B., & Hu, L. (1989). Perceptions of ingroup and outgroup variability: A meta-analytic integration. Basic and Applied Social Psychology, 10, 233-252.

Mullen, B., Johnson, D.A., & Drake, S.D. (1987). Organizational productivity as a function of group composition: A self-attention perspective. Journal of Social Psychology, 127, 143-150.

Mullen, B., & Rosenthal, R. (1985). BASIC Meta-analysis: Procedures and Programs. Hillsdale, NJ: Erlbaum.

Mullen, B., Salas, E., & Driskell, J.E. (1989). Salience, motivation, and artifact as contributions to the relation between participation rate and leadership. Journal of Experimental Social Psychology, 25, 545-559.

Norris, D.R., & Niebuhr, R.E. (1980). Group variables and gaming success. Simulation and Games, 11, 301-312.

Oliver, L.W. (1990). The relationship of cohesion and performance: A meta-analysis and critique of the literature. Unpublished manuscript, U.S. Army Research Institute.

Orwell, G. (1946). Animal Farm. New York, NY: Harcourt, Brace,

Jovanovich.

Piper, W.E., Marrache, M., Lacroix, R., Richardson, A.M., & Jones, B.D. (1983). Cohesion as a basic bond in groups. Human Relations, 36, 93-108.

Putti, J.M. (1985). Leader behavior and group characteristics in work improvement teams - The Asian context. Public Personnel Management, 14, 301-306.

Rogosa, D. (1980). A critique of cross-lagged correlation. Psychological Bulletin, 88, 245-258.

Rosenthal, R. (1991) Meta-analytic procedures for social research. Beverly Hills, CA: Sage.

Rousseau, D.M. (1990). Normative beliefs in fund-raising organizations. Group and Organization Studies, 15, 448-460.

Schachter, S. (1951). Deviation, rejection, and communication. Journal of Abnormal and Social Psychology, 46, 190-207.

Schachter, S., Ellertson, N., McBride, D., & Gregory, D. (1951). An experimental study of cohesiveness and productivity. Human Relations, 4, 229-238.

Sheikh, A.A., & Koch, R.J. (1977). Recall of group tasks as a function of group cohesiveness and interruption of tasks. Psychological Reports, 40, 275-278.

Shirom, A. (1976). On some correlates of combat performance. Administrative Sciences Quarterly, 21, 419-432.

Siegel, J.P., & Bowen, D. (1971). Satisfaction and performance: Causal relationships and moderating effects. Journal of Vocational Behavior, 1, 263-269.

Slater, P.E. (1958). Contrasting correlates of group size.

Sociometry, 21, 129-139.

Steel, R.P., Shane, G.S., & Kennedy, K.A. (1990). Effects of social system factors on absenteeism, turnover, and job performance. Journal of Business and Psychology, 4, 423-430.

Stinson, J.E., & Hellebrandt, E.T. (1972). Group cohesiveness, productivity, and strength of formal leadership. Journal of Social Psychology, 87, 99-105.

Stogdill, R.M. (1972). Group productivity, drive, and cohesiveness. Organizational Behavior and Human Performance, 8, 26-43.

Summers, I., Coffelt, T., & Horton, R.E. (1988). Work-group cohesion. Psychological Reports, 63, 627-636.

Tehan, T.A. (1983). The development and evaluation of effectiveness of cohesiveness training with high school basketball teams. Ph.D. dissertation, Virginia Commonwealth University.

Terborg, J.R., Castore, C., & DeNinno, J.A. (1976). A longitudinal field investigation of the impact of group composition on group performance and cohesion. Journal of Personality and Social Psychology, 34, 782-790.

Tziner, A. (1982). Differential effects of group cohesiveness types: A clarifying overview. Social Behavior and Personality, 10, 227-239.

Tziner, A., & Vardi, Y. (1983). Ability as a moderator between cohesiveness and tank crews performance. Journal of Occupational Behavior, 4, 137-143.

Widmeyer, W.N. (1977). When cohesiveness predicts performance outcome in sport. Ph.D. Dissertation, University of Illinois - Urbana.

Widmeyer, W.N., Brawley, C., & Carron, A.V. (1992). Group Dynamics in sport. In T.S. Horn (Ed.), Advances in sport psychology. Champaign, IL: Human Kinetics Publishers.

Williams, J.M., & Hacker, C.M. (1982). Causal relationships among cohesion, satisfaction, and performance in women's intercollegiate field hockey teams. Journal of Sport Psychology, 4, 324-337.

Williams, J.M., & Widmeyer, W.N. (1991). The cohesion - performance outcome relationship in a coacting sport. Journal of Sport and Exercise Psychology, 13, 364-371.

Wolfe, J., & Box, T.M. (1988). Team cohesion effects on business game performance. Simulation and Games, 19, 82-98.

Worchel, S., Cooper, J., & Goethals, G.R. (1991). Understanding social psychology (5th edition). Pacific Grove, CA: Brooks/Cole.

Zaccaro, S.J., & Lowe, C.A. (1986). Cohesiveness and performance on an additive task: Evidence for multidimensionality. Journal of Social Psychology, 128, 547-558.

Zaccaro, S.J., & McCoy, C. (1988). The effects of task and interpersonal cohesiveness on performance of a disjunctive group task. Journal of Applied Social Psychology, 18, 837-851.

Footnotes

1. (on coverpage)

2. Two of the earliest, and most frequently cited, studies in the experimental paradigm were not included in this meta-analytic database: Schachter et al. (1951) and Berkowitz (1954). These two studies had to be eliminated according to the selection criteria specified above. Specifically, these two studies manipulated standards of performance, and the present effort eliminated studies which manipulated additional variables. It is intriguing to note that practically every narrative summary of the cohesiveness - performance effect published in scholarly journals or textbooks cites one or both of these two studies (often to the exclusion of any other citations). The importance of standards of performance in determining the cohesiveness - performance effect, based on these two studies alone, often comprises the bulk of discussion of the cohesiveness - performance effect (and sets the stage for the various depictions of "mixed results" described above).

None of the studies included in the present meta-analytic database explicitly manipulated standards of performance beyond the "natural" standards of excellence relevant for the specific group under consideration. That is, members of a basketball team are probably operating under positive standards of performance, as are members of a business class simulation game, members of a military rifle squad, and so on. But, none of the hypothesis tests included in the present database represent an explicit manipulation of (positive vs. negative) performance standards. Efforts to derive meta-analytic predictors gauging performance standards were thwarted

by the invariantly high degrees of standards of performance in all studies of the cohesiveness - performance effect.

It is interesting to consider the results of a mini-meta-analysis combining the results reported from these two classic studies which manipulated performance standards: In Schachter et al.'s and Berkowitz's negative performance standard conditions, cohesiveness led to a decrease in performance to a small degree, $\bar{r}$ = -.291; in Schachter et al.'s and Berkowitz's positive performance standard conditions, cohesiveness led to an increase in performance to a small degree, $\bar{r}$ = .269. The magnitudes of these two effects were significantly different, Z = 3.492, p = .000239. While the experimental manipulation of a negative performance standard may be able to reverse the cohesiveness - performance effect, the experimental manipulation of a positive performance standard doesn't dramatically increase the basic cohesiveness - performance effect obtained when standards of performance are <u>not</u> experimentally manipulated (reported below).

3. Examples of groups categorized as <u>low interaction requirement</u> were: golf teams where performance was the summed tournament score of the team; military squads engaged in a marksmanship test where performance was the summed score of the squad. Examples of groups categorized as <u>high interaction requirement</u> were: basketball teams where performance was the season performance for the team; business simulation groups where performance was the net profit of the group based on its collective decisions.

4. Examples of items categorized as <u>interpersonal attraction</u>

were: Friendship; Feeling of belongingness; Gets along together; How well do you like your group. Examples of items categorized as commitment to task were: Enjoyment gained from (task); Personal involvement in team activities; How attractive do you find the activities of the group; Satisfied with performance of group. Examples of items categorized as group pride were: Group compares favorably to others of its kind; Sense of pride in belonging to group; Believe group is important to success of (broader organization within which group resides); Rank ordering of own group (within broader organization). A fourth type of item (not included in these analyses) represented "other" items that had no bearing on the three components of cohesiveness. Examples of items categorized as "other" were: How team members tolerate deviant members; Would discuss personal problems with my group; Committed to (broader organization) as your employer; Feel sexually aroused in group.

5. Extreme one-tailed p values are reported precisely in scientific notation. Thus, p = 1.51E-16 is p = .000000000000000151.

Table 1. Hypothesis tests included in the main meta-analytic database.

Study	Statistics[1]	Z	r	Size[2]	Real[3]	Paradigm[4]	Interaction[5]
Bakeman & Helmreich (1975)	r(8)=.645 [48] {+}	2.009	.645	5	1**	1	0
Bhatara (1972)	t(38)=2.630 [40] {+}	2.504	.392	3	0	0	1
Bhatara (1972)	t(38)=2.054 [40] {+}	1.987	.316	3	0	0	1
Bhatara (1972)	t(38)=2.307 [40] {+}	2.129	.478	3	0	0	1
Blades (1986)	r(9)=.140 [431] {+}	0.410	.140	8.8	1**	1	1
Bowen & Siegel (1973)	r(84)=.086 [86] {+}	0.787	.086	3.9	0	1	1
Carron & Ball (1977)	r(10)=.680 [183] {+}	2.428	.680	6	1*	1	1
Chatterjee (1972)	r(198)=.320 [200] {+}	4.619	.320	8.8	1	1	0
Courtright (1978)	F(1,90)=0.028 [32] {+}	0.167	.018	4	0	0	1
Dailey (1978)	r(279)=.188 [281] {+}	3.166	.188	6.2	1	1	1
Darley et al. (1952)	r(11)=.400 [130] {+}	1.353	.400	10	1	1	1
Deep et al. (1967)	r(7)=.170 [93] {-}	-0.437	-.170	10.3	0	1	1
Dorfman & Stephan (1984)	r(91)=.326 [93] {+}	3.189	.326	3.5	0	1	1
Downey et al. (1975)	r(21)=.158 [275] {+}	0.720	.158	12	1**	1	1
Elias (1984)	r(16)=.316 [72] {+}	1.277	.316	4	0	1	1
Gekoski (1952)	r(19)=.100 [231] {+}	0.431	.100	11	1	1	1
George & Bettenhausen (1990)	r(31)=.040 [370] {+}	0.221	.040	11.21	1	1	0

Goodacre (1951)	r(10)=.770 [72] {+}	2.922	.770	6	1**	1	1
Gottheil & Vielhaber (1966)	r(18)=.194 [259] {+}	0.819	.194	10	1**	1	1
Gowda (1988)	r(39)=.098 [41] {+}	0.610	.098	6.5	1	1	0
Grace (1954)	r(12)=.300 [178] {+}	1.041	.300	5	1*	1	1
Greene (1989)	r(52)=.051 [702] {+}	0.366	.051	13	1	1	1
Haythorn (1953)	r(14)=.290 [16] {+}	1.089	.290	4	1	1	1
Hemphill & Sechrest (1952)	r(88)=.180 [450] {+}	1.698	.180	5	1**	1	1
Hoogstraten & Vorst (1978)	t(18)=1.691 [64] {+}	1.606	.370	4	0	0	1
Hoogstraten & Vorst (1978)	t(18)=2.431 [64] {+}	2.229	.497	4	0	0	1
Hoogstraten & Vorst (1978)	t(18)=0.740 [64] {-}	-0.724	-.172	4	0	0	1
Hoogstraten & Vorst (1978)	t(14)=1.788 [62] {+}	1.666	.431	4	0	0	1
Hoogstraten & Vorst (1978)	r(60)=.125 [62] {+}	0.968	.125	4	0	0	1
Hoogstraten & Vorst (1978)	r(62)=.101 [64] {+}	0.794	.101	4	0	0	1
Jaffe & Nebenzahl (1990)	r(18)=.157 [110] {+}	0.661	.157	5.5	0	1	1
Keller (1986)	r(30)=.470 [278] {+}	2.714	.470	8.7	1	1	1
Landers et al. (1982)	r(8)=.762 [71] {+}	2.553	.762	5	1*	1	1
Lodahl & Porter (1961)	r(53)=.190 [495] {+}	1.389	.190	9	1	1	1
Lorenz (1985)	r(19)=.469 [147] {+}	2.144	.469	7	1	1	1

McGrath (1962)	r(24)=.201 [53] {+}	0.984	.201	3	1**	1	0
Melnick & Chemers (1974)	r(19)=.063 [135] {+}	0.271	.063	5	1*	1	1
Mossholder & Bedeian (1983)	r(16)=.120 [112] {+}	0.474	.120	6.2	1	1	1
Norris & Niebuhr (1980)	r(16)=.440 [68] {+}	1.826	.440	3.8	0	1	1
Piper et al. (1983)	r(7)=.212 [40] {+}	0.547	.212	5	0	1	1
Putti (1985)	r(16)=.490 [80] {+}	2.063	.490	5.5	1	1	1
Rousseau (1990)	r(30)=.178 [263] {+}	0.975	.178	8.2	1	1	0
Sheikh & Koch (1977)	F(1,88)=18.31 [90] {+}	4.067	.415	5	0	0	0
Shirom (1976)	r(98)=.200 [100] {+}	1.995	.200	20	1**	1	1
Siegel & Bowen (1971)	r(18)=.075 [86] {+}	0.314	.075	4	0	1	1
Steel et al. (1990)	r(67)=.040 [69] {-}	-0.326	-.040	8.8	1**	1	1
Stinson & Hellebrandt (1972)	r(23)=.049 [125] {+}	0.233	.049	5	0	1	1
Tehan (1983)	r(14)=.560 [176] {+}	2.254	.560	5	1*	1	1
Terborg et al. (1976)	r(40)=.039 [133] {-}	-0.245	-.039	3.2	0	1	1
Tziner & Vardi (1983)	r(113)=.320 [345] {+}	3.486	.320	3	1**	1	1
Widmeyer (1977)	r(63)=.440 [66] {+}	3.667	.440	3	1*	1	1
Williams & Hacker (1982)	r(7)=.811 [132] {+}	2.640	.811	11	1*	1	1
Williams & Widmeyer (1991)	r(81)=.409 [83] {+}	3.839	.409	4.6	1*	1	0

Wolfe & Box (1988)	r(34)=.320 [162] {+}	1.902	.320	4.5	0	1	1
Zaccaro & Lowe (1986)	t(50)=3.240 [28] {+}	3.071	.417	3	0	0	0
Zaccaro & Lowe (1986)	t(50)=0.369 [26] {+}	0.367	.052	3	0	0	0
Zaccaro & Lowe (1986)	t(50)=2.282 [28] {+}	2.215	.307	3	0	0	0
Zaccaro & Lowe (1986)	t(50)=0.958 [28] {+}	0.949	.134	3	0	0	0
Zaccaro & Lowe (1986)	t(50)=1.823 [28] {+}	1.785	.250	3	0	0	0
Zaccaro & Lowe (1986)	t(50)=2.744 [26] {+}	2.635	.362	3	0	0	0
Zaccaro & McCoy (1986)	t(128)=3.176 [64] {+}	3.110	.270	4	0	0	1
Zaccaro & McCoy (1986)	t(128)=1.154 [64] {+}	1.149	.101	4	0	0	1
Zaccaro & McCoy (1986)	t(128)=2.187 [68] {+}	2.163	.190	4	0	0	1
Zaccaro & McCoy (1986)	t(128)=1.081 [68] {-}	-1.076	-.095	4	0	0	1
Zaccaro & McCoy (1986)	t(128)=1.000 [68] {+}	0.996	.088	4	0	0	1
Zaccaro & McCoy (1986)	t(128)=2.023 [64] {+}	2.003	.176	4	0	0	1

Note: [1] (df) [N] {Direction of Effect}
[2] Group Size
[3] 0 = artificial groups
1 = real groups
(* indicates sports teams, ** indicates military groups)
[4] Paradigm: 1 = Correlational Paradigm
0 = Experimental Paradigm
[5] Interaction: 1 = High interaction requirement
0 = Low interaction requirement

Table 2. Hypothesis tests included in examination of the effects of components of cohesiveness.

Study	Statistics[1]	Z	r	IA	CT	GP[2]	Paradigm[3]
Bhatara (1972)	t(38)=2.630 [40] {+}	2.504	.392	80	74	44	0
Bhatara (1972)	t(38)=2.054 [40] {+}	1.987	.316	80	74	44	0
Bhatara (1972)	t(38)=2.307 [40] {+}	2.129	.478	80	74	44	0
Blades (1986)	r(9)=.140 [431] {+}	0.410	.140	50	50	0	1
Bowen & Siegel (1973)	r(84)=.086 [86] {+}	0.787	.086	25	25	25	1
Carron & Ball (1977)	r(10)=.421 [183] {+}	1.361	.421	100	0	0	1
	r(10)=.784 [183] {+}	3.010	.784	0	100	0	1
	r(10)=.034 [183] {-}	-0.105	-.034	0	0	0	1
Courtright (1978)	F(1,90)=0.028 [32] {+}	0.167	.018	50	34	4	0
Dailey (1978)	r(279)=.188 [281] {+}	3.166	.188	53	22	0	1
Darley et al. (1952)	r(11)=.590 [130] {+}	2.120	.590	0	100	0	1
	r(11)=.327 [130] {+}	1.090	.327	100	0	0	1
Dorfman & Stephan (1984)	r(91)=.326 [93] {+}	3.189	.326	0	100	0	1
Downey et al. (1975)	r(21)=.158 [275] {+}	0.720	.158	17	66	0	1
Elias (1984)	r(16)=.316 [72] {+}	1.277	.316	63	12	0	1
Gowda (1988)	r(39)=.098 [41] {+}	0.610	.098	61	17	5	1
Hoogstraten & Vorst (1978)	t(18)=1.691 [64] {+}	1.606	.370	36	10	30	0

Hoogstraten & Vorst (1978)	t(18)=2.431 [64] {+}	2.229	.497	36	10	30	0
Hoogstraten & Vorst (1978)	t(18)=0.740 [64] {-}	-0.724	-.172	36	10	30	0
Hoogstraten & Vorst (1978)	t(14)=1.788 [62] {+}	1.666	.431	36	10	30	0
Hoogstraten & Vorst (1978)	r(60)=.125 [62] {+}	0.968	.125	36	10	30	0
Hoogstraten & Vorst (1978)	r(62)=.101 [64] {+}	0.794	.101	36	10	30	0
Landers et al. (1982)	r(8)=.644 [71] {+}	2.004	.644	100	0	0	1
	r(8)=.636 [71] {+}	1.972	.636	0	100	0	1
	r(8)=.613 [71] {+}	1.880	.613	0	0	0	1
Lorenz (1985)	r(19)=.469 [147] {+}	2.144	.469	38	12	25	1
McGrath (1962)	r(24)=.201 [53] {+}	0.984	.201	100	0	0	1
Melnick & Chemers (1974)	r(19)=.084 [135] {+}	0.362	.084	100	0	0	1
	r(19)=.000 [135] {+}	0.000	.000	0	100	0	1
Piper et al. (1983)	r(7)=.330 [40] {+}	0.866	.330	60	0	0	1
	r(7)=.140 [40] {+}	0.359	.140	60	40	0	1
	r(7)=.160 [40] {+}	0.411	.160	60	40	0	1
Sheikh & Koch (1977)	F(1,88)=18.31 [90] {+}	4.067	.415	46	30	20	0
Shirom (1976)	r(98)=.200 [100] {+}	1.995	.200	33	67	0	1
Siegel & Bowen (1971)	r(18)=.075 [86] {+}	0.314	.075	0	100	0	1
Tehan (1983)	r(14)=.560 [176] {+}	2.254	.560	60	40	0	1
Terborg et al.	r(40)=.039	-0.245	-.039	100	0	0	1

(1976)	[133] {-}						
Widmeyer (1977)	r(63)=.440 [66] {+}	3.667	.440	71	29	0	1
Williams & Hacker (1982)	r(7)=.744 [132] {+}	2.289	.744	100	0	0	1
	r(7)=.875 [132] {+}	3.071	.875	0	100	0	1
	r(7)=.223 [132] {+}	0.576	.223	0	0	0	1
Wolfe & Box (1988)	r(34)=.320 [162] {+}	1.902	.320	100	0	0	1
Zaccaro & Lowe (1986)	t(50)=3.240 [28] {+}	3.071	.417	10	36	32	0
Zaccaro & Lowe (1986)	t(50)=0.369 [26] {+}	0.367	.052	24	10	14	0
Zaccaro & Lowe (1986)	t(50)=2.282 [28] {+}	2.215	.307	24	50	52	0
Zaccaro & Lowe (1986)	t(50)=0.958 [28] {+}	0.949	.134	14	14	18	0
Zaccaro & Lowe (1986)	t(50)=1.823 [28] {+}	1.785	.250	0	40	24	0
Zaccaro & Lowe (1986)	t(50)=2.744 [26] {+}	2.635	.362	0	26	6	0
Zaccaro & McCoy (1986)	t(128)=3.176 [64] {+}	3.110	.270	6	46	30	0
Zaccaro & McCoy (1986)	t(128)=1.154 [64] {+}	1.149	.101	24	10	20	0
Zaccaro & McCoy (1986)	t(128)=2.187 [68] {+}	2.163	.190	24	46	44	0
Zaccaro & McCoy (1986)	t(128)=1.081 [68] {-}	-1.076	-.095	22	0	14	0
Zaccaro & McCoy (1986)	t(128)=1.000 [68] {+}	0.996	.088	0	36	24	0
Zaccaro & McCoy (1986)	t(128)=2.023 [64] {+}	2.003	.176	0	36	10	0

Note: [1] (df) [N] {Direction of Effect}
[2] IA = Interpersonal Attraction
CT = Commitment to Task
GP = Group Pride
[3] Paradigm: 1 = Correlational Paradigm
0 = Experimental Paradigm

Table 3. Hypothesis tests included in the examination of temporal patterns in the cohesiveness - performance effect.

Study [time-lag][2]	Statistics[1] C1P1	C2P2	C1C2	P1P2	C1P2	C2P1
Bakeman & Helmreich (1975) [9]	r(8)=.176 [48] {+}	r(8)=.725 [48] {+}	r(8)=.307 [48] {+}	r(8)=.816 [48] {+}	r(8)=.133 [48] {+}	r(8)=.717 [48] {+}
Bowen & Siegel (1973) [21]	r(84)=-.093 [86] {-}	r(84)=.026 [86] {+}	r(84)=.117 [86] {+}	r(84)=.243 [86] {+}	r(84)=.047 [86] {+}	r(84)=.335 [86] {+}
	r(84)=.093 [86] {+}	r(84)=.309 [86] {+}	r(84)=.347 [86] {+}	r(84)=.159 [86] {+}	r(84)=.261 [86] {+}	r(84)=.361 [86] {+}
	r(84)=.026 [86] {+}	r(84)=.093 [86] {+}	r(84)=.412 [86] {+}	r(84)=-.064 [86] {-}	r(84)=-.004 [86] {-}	r(84)=.310 [86] {+}
Carron & Ball (1977) [49]	r(10)=.520 [183] {+}	r(10)=.790 [183] {+}	r(10)=.821 [183] {+}	r(10)=.799 [183] {+}	r(10)=.391 [183] {+}	r(10)=.770 [183] {+}
Dorfman & Stephan (1984) [42]	r(91)=.270 [93] {+}	r(91)=.380 [93] {+}	r(91)=.560 [93] {+}	r(91)=.490 [93] {+}	r(91)=.300 [93] {+}	r(91)=.100 [93] {+}
Greene (1989) [270]	r(52)=-.052 [702] {-}	r(52)=.150 [702] {+}	r(52)=.500 [702] {+}	r(52)=.650 [702] {+}	r(52)=.170 [702] {+}	r(52)=.300 [702] {+}
Landers et al. (1982) [24]	r(8)=.830 [71] {+}	r(8)=.770 [71] {+}	r(8)=.930 [71] {+}	r(8)=.799 [71] {+}	r(8)=.800 [71] {+}	r(8)=.850 [71] {+}
	r(8)=.770 [71] {+}	r(8)=.660 [71] {+}	r(8)=.870 [71] {+}	r(8)=.799 [71] {+}	r(8)=-.720 [71] {-}	r(8)=.640 [71] {+}
Williams & Hacker (1982) [35]	r(7)=.870 [132] {+}	r(7)=.730 [132] {+}	r(7)=.870 [132] {+}	r(8)=.800 [132] {+}	r(7)=.720 [132] {+}	r(7)=.870 [132] {+}

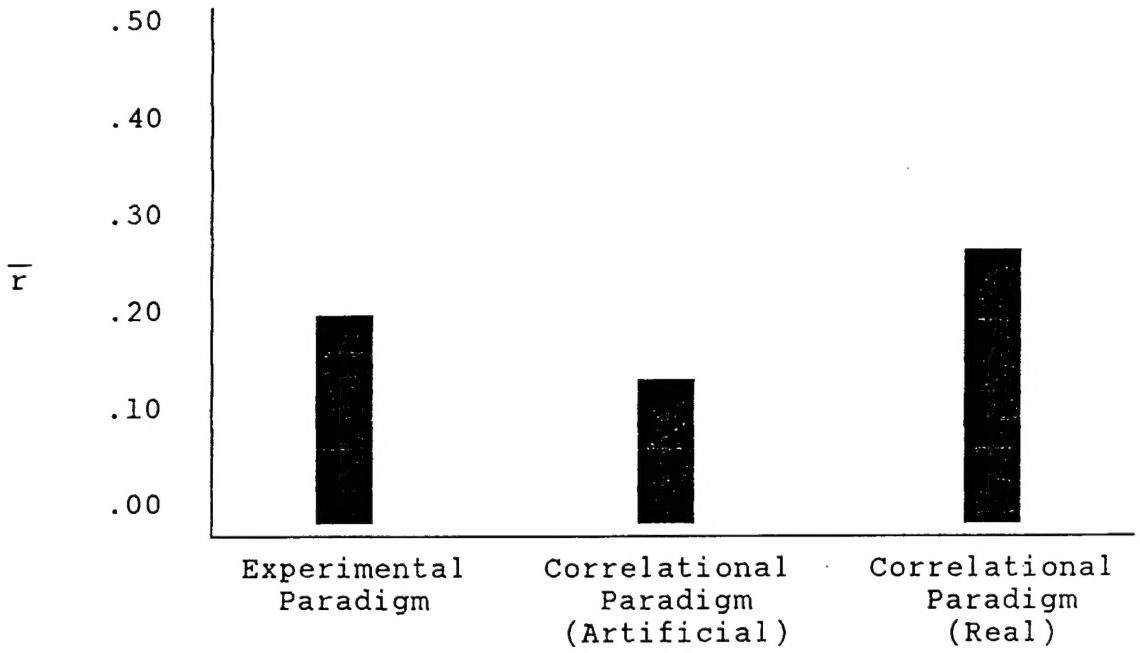
Note: [1] C1P1 = time 1 Cohesiveness - time 1 Performance correlation
C2P2 = time 2 Cohesiveness - time 2 Performance correlation
C1C2 = time 1 Cohesiveness - time 2 Cohesiveness correlation
P1P2 = time 1 Performance - time 2 Performance correlation
C1P2 = time 1 Cohesiveness - time 2 Performance correlation
P1C2 = tim2 1 Performance - time 2 Cohesiveness correlation
(df) [N] {Direction of Effect}
[2] Days

Figure Captions

Figure 1. Magnitude of the cohesiveness - performance effect as a function of paradigm and reality of group.

Figure 2. Magnitude of the cohesiveness - performance effect as a function of type of group in the correlational paradigm.

Figure 3. Meta-analytic cross-lagged panel correlation.


.50
.40
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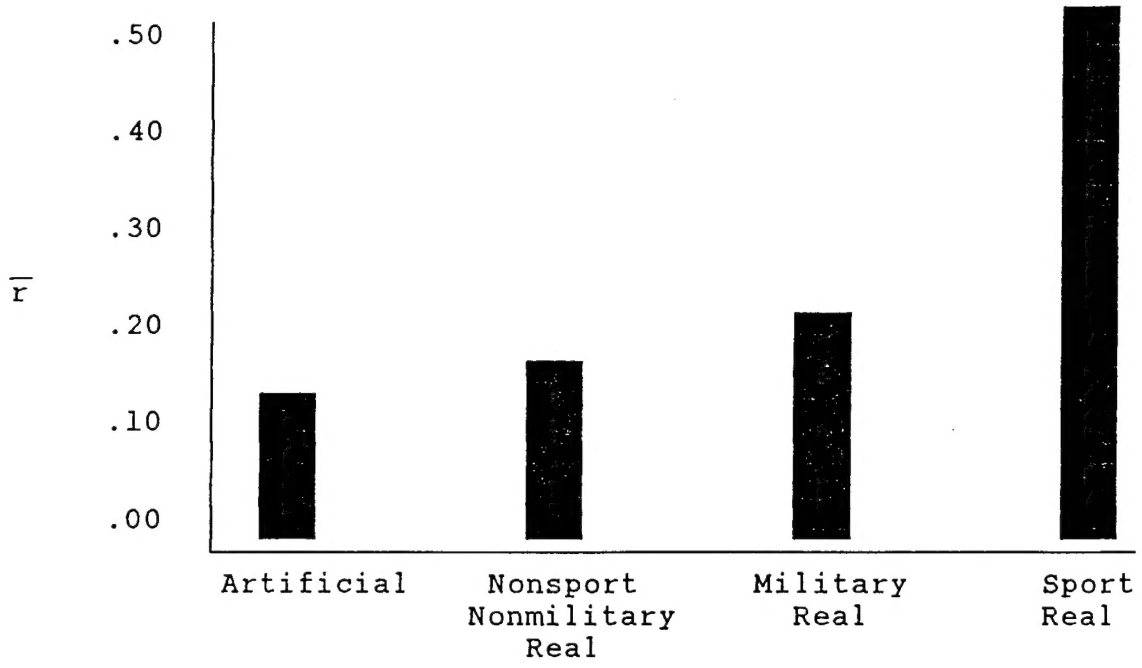
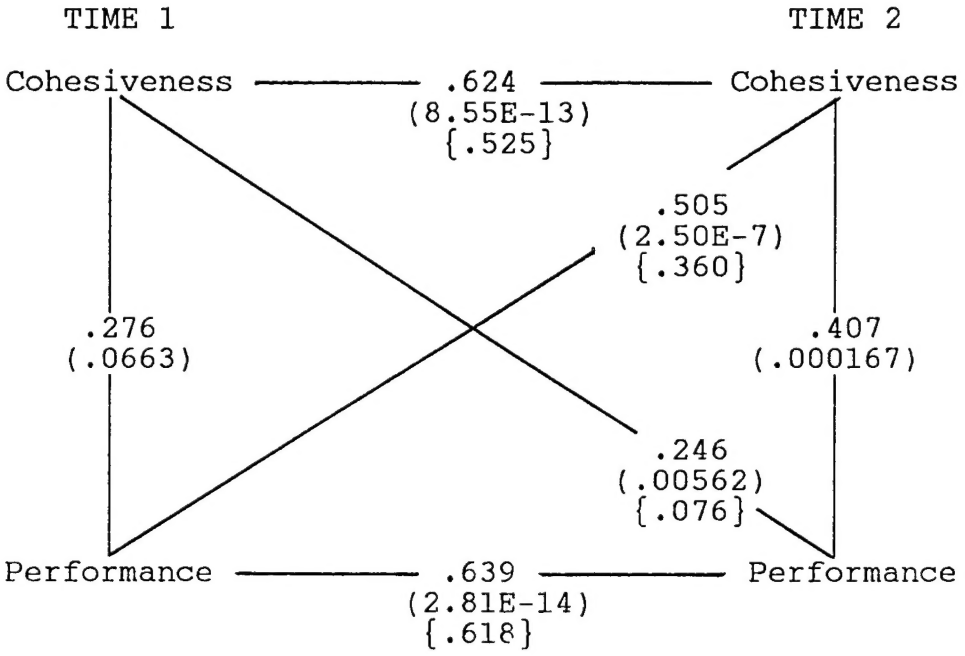
$\overline{r}$
.20
.10
.00
Experimental Paradigm
Correlational Paradigm (Artificial)
Correlational Paradigm (Real)


.50
.40
.30
.20
.10
.00
r
Artificial
Nonsport Nonmilitary Real
Military Real
Sport Real



Note: Meta-analytic combinations of effect size
(Meta-analytic combinations of significance level)
{Causal parameters}